



Reducing Diesel Emissions to Meet the Clean Air Challenge in Illinois

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Diesel Vehicles: Major Source of Emissions in IL, IN, OH, MI, WI (LADCO States)

- Mobile Sources
 - 60% of total NO_x emissions
 - 25% of total PM 2.5 emissions
- Diesel Vehicles
 - 40% of NO_x emissions
 - 15% of PM 2.5 emissions

Diesel Vehicles: Major Source of Emissions in IL, IN, OH, MI, WI (LADCO States)

- About 50% of projected 2009 NO_x and PM on-road emissions are from heavy-duty diesel vehicles (HDDVs)
 - Heavy-HDDVs (i.e. class 8 trucks) alone contribute about 35% of both NO_x and PM emissions.
- More than 80% of 2009 NO_x and 50% of PM non-road emissions are from diesel equipment.
 - Construction and agricultural diesel equipment each contribute more than 30% of NO_x and 20% of PM emissions.
- Commercial marine and locomotive contribute to about 40% of NO_x and 20% of PM emissions of the total 2002 off-road emission inventory.

Diesel Vehicles: Major Source of Emissions in IL, IN, OH, MI, WI (LADCO States)

- Of the five LADCO states, Illinois' mobile source NO_x and PM emissions rank:
 - 3rd for on-road vehicles
 - 1st for off-road vehicles
 - 1st for locomotives
 - 1st for total on- and off-road NO_x and PM emissions

Additional Diesel Emissions Reductions Are Critical

- Plans to meet ozone (8-hour) and PM_{2.5} air quality standards are due in mid-2007 and early 2008, respectively.
- 2010 is the attainment deadline for both ozone and PM 2.5.
- **Current and planned emissions reductions will not be enough**, including introduction of Ultra-low Sulfur Diesel and lower emissions limits for new diesels.
- Need to identify additional control strategies in 2006.

On-road HDDV Population Estimates

2009 H-HDDV Population Estimates in LADCO	
Model Year Group	Population
MY 1989 and Earlier	88,148
MY 1990	8,308
MY 1991 - 1997	49,786
MY 1998 - 2001	22,943
MY 2002 - 2006	24,145
Total	193,330

Note:The population estimates for on-road HDDVs (i.e. Class 8 trucks) were estimated based on projected 2009 VMT data from the 2002 FHWA VMT data by facility types with an assumed constant growth rate of 2% per year as suggested by LADCO, vehicle mix fractions developed in a ENVIRON's study for LADCO, and data in MOBILE6 technical support documents.

Construction Equipment - Major NOx Emission Contributors

Major NOx Emission Contributors in the 2009 Construction Equipment Emissions.			
Equipment Type	Population	NOx Emissions (tpd)	NOx Contribution (%)
R9:750+_Off-highway Trucks	1,500	27.7	10.2%
R8:600-749_Rubber Tire Loaders	6,046	17.7	6.5%
R9:750+_Crawler Tractor/Dozers	1,932	14.4	5.3%
R7:300-599_Excavators	8,204	14.3	5.3%
R6:175-299_Excavators	11,222	12.3	4.5%
R7:300-599_Rubber Tire Loaders	8,241	11.2	4.1%
R8:600-749_Crawler Tractor/Dozers	3,122	10.4	3.8%
R7:300-599_Crawler Tractor/Dozers	6,166	9.8	3.6%
R5:100-174_Tractors/Loaders/Backhoes	20,644	9.5	3.5%
R9:750+_Rubber Tire Loaders	1,008	9.5	3.5%
R6:175-299_Tractors/Loaders/Backhoes	13,736	8.5	3.1%
Other Construction Equipment (<3%)	172,018	127.6	46.7%
Total	253,840	272.8	100%

Agricultural Equipment - Major NOx Emission Contributors

Major NOx Emission Contributors in the 2009 Agricultural Equipment Emissions

Equipment Type	Population	NOx Emissions (tpd)	NOx Contribution (%)
R8:600-749_Agricultural Tractors	31,270	68.1	26.8%
R7:300-599_Agricultural Tractors	60,432	59.5	23.4%
R6:175-299_Agricultural Tractors	70,097	40.9	16.1%
R7:300-599_Combines	36,051	18.4	7.2%
R5:100-174_Agricultural Tractors	42,069	16.2	6.4%
R4:75-99_Agricultural Tractors	47,732	13.3	5.2%
R6:175-299_Combines	30,233	9.6	3.8%
R2:25-49_Agricultural Tractors	72,373	8.4	3.3%
R3:50-74_Agricultural Tractors	30,145	5.6	2.2%
Other Agricultural Equipment (<2%)	46,671	14.4	5.7%
Total	467,073	254.3	100%

Technical Report Prepared for LADCO Identified Priority Mobile Source NOx Control Measures

- Alternative fuels for HDDVs
 - Natural gas & dual fuel technologies
- Cleaner conventional fuels for diesel vehicles and equipment
 - Emulsified diesel fuel & California diesel fuel
- Vehicle/fleet/equipment modernization programs
 - Engine repowering and vehicle/equipment replacement for HDDVs or diesel equipment
 - LEV II/accelerated vehicle replacement/scrappage programs for LDVs/LDTs
- Diesel retrofit programs (focusing on reducing NOx emissions)
 - Lean NOx catalysts & Selective Catalytic Reduction (SCR)
 - Exhaust Gas Recirculation (EGR)+Diesel Particulate Filters (DPF)
 - Anti-idling technologies (more interest with increasing fuel prices)
- Accelerated reflashing program for HDDVs, and vehicle inspection and maintenance (I/M) programs for LDVs

LADCO Consultant Analyzed Emission Reduction Scenarios

- A combination of voluntary/incentive and mandatory control measures:
 - 10% reduction in 2009 on-road diesel NOx emissions
 - 15% reduction in 2009 non-road diesel NOx emissions.
 - Cost-effective NOx reductions: \$4000-\$7000/ton
 - This analysis focused on NOx. LADCO will update and supplement this analysis to assess the potential for PM reductions.
 - Increasing fuel prices

Source: “Evaluation of Candidate Mobile Source Control Measures.” Environ. February 2006.

Illinois' Clean Diesel Initiative

- **Governor's Illinois Clean School Program.** Launched in 2003. More than \$2.3 million to clean up nearly 2400 school buses.
- **Dan Ryan Expressway Clean Air Construction Initiative.** Requires ULSD or pollution retrofits for construction equipment. Off-road diesel fuel not allowed. Idling limits and dust controls.
- **Illinois uses more biodiesel than any other state,** thanks in part to legislation the Governor signed that eliminates the sales tax on certain percentages of biodiesel.
- **Emissions inspections for HDDVs by IDOT (scheduled) and State Police (roadside).**

Illinois' Clean Diesel Initiative

- **Illinois EPA provides rebates for 20% or higher blends of biodiesel, as part of the Alternate Fuels Rebate program.**
- **State of Illinois diesel pumps have been switched to 2% biodiesel.**
- **In 2005 the Governor signed legislation that requires governments at all levels, schools/colleges/universities, and mass transit agencies to use 2 percent biodiesel.**
- **Two truck-stop electrification projects near toll roads in metropolitan Chicago; one in metro E. St. Louis.**
- **The City of Chicago has implemented numerous clean diesel strategies.**

Summary

- Diesel vehicles are a major source of emissions, especially heavy-duty trucks, construction and agricultural equipment and locomotives.
- Current and planned emissions reductions will not be enough to achieve air quality standards in Illinois.
- Technologies and strategies to reduce diesel emissions are available and cost-effective.



Summary

- Significant reductions can be achieved, although many strategies are voluntary and will require cooperation and innovation.
- Illinois is a leader in implementing clean diesel strategies – but more is needed!
- Thank you!